Strategy Research Project

THE SHORTAGE OF DENTISTS: A RISK TO NATIONAL SECURITY?

BY

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USAWC STRATEGY RESEARCH PROJECT

THE SHORTAGE OF DENTISTS: A RISK TO NATIONAL SECURITY?

by

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ABSTRACT

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The United States military relies on dental readiness as a key component of a service members' medical readiness status. Excellent oral health is a force multiplier because the dental emergency rate diminishes when the oral health status of the force increases. In recent years the Army's dental accessions have dropped to all time lows and there are an insufficient number of dentists in the Corp to handle the current workload. At the present time there are sufficient numbers to accomplish the dental readiness mission.

The threat of a national shortage of dentists is rising and the ratio of dentists to the general US population continues to decline as the population increases faster than new dentists enter the field. Factors contributing to a potential national dental care crisis and its effect on the dental readiness of the United States military are outlined in this paper. Specific areas considered are oral disease as it relates to the nation and by extension to the military mission to maintain dental readiness; delineation of the recruiting pool; and an analysis on why the military is unsuccessful in attracting and retaining dental officers. The discussion will include a number of recommendations and a conclusion.

THE SHORTAGE OF DENTISTS: A RISK TO NATIONAL SECURITY?

The United States Army deploys well-trained, properly equipped, and physically fit soldiers. Dental readiness is a critical component of the soldier's overall medical readiness status[1] and is primarily a unit and soldier responsibility.[2] The US Army Dental Command (DENCOM) provides the resources and services to accomplish this mission.

In allocating resources for patient care DENCOM has three prioritized missions that address the dental readiness and oral health of the force. The highest priority is to ensure that all deploying soldiers are 100% dental ready, second is to achieve at least 95% dental readiness for all other soldiers on active duty, and the third is to achieve at least 65% oral health in the active duty Army.

In recent years the operation tempo of the Army and the lack of sufficient resources, primarily dentists, have constrained DENCOM to accomplish the first priority at the expense of the other two. In the present operation tempo the lack of shortage of dental health care providers makes even the dental readiness mission a challenge. The Army is not alone. Across the Department of Defense (DoD) the other services face similar challenges recruiting and retaining dental officers.[3]

Perhaps the core issue is the determination of whether the DoD's difficulty recruiting and retaining dentists is related only to current military operations, to pay issues, to both, or to a short supply of dentists within the United States. If a short supply of dentists is the issue then the problem is serious and if the supply of dentists continues to tighten then the oral health of the Nation is at risk.[4]

This paper will outline the contributing factors to a potential national dental care crisis and its effect on the dental readiness of the United States military. Consideration will be given to oral disease as it relates to the nation and by extension to the military's efforts to maintain dental readiness, recruit and retain qualified dentists, and to accomplish a high oral health standard in support of the military mission. The discussion will include conclusions and recommendations.

National Shortage of Dentists

Currently in many parts of the US the lack of access to dental care is a reality. More than 45.3 million citizens live in designated dental health profession shortage areas (DHPSA).[5] A DHPSA is a geographic area or population group that has been designated by the Secretary of the Department of Health and Human Services as having a shortage of dental health professionals.[6]

The US population continues to grow[7] while the supply of dentists is leveling off,[8] if not declining.[9] The number of dentists per 100,000 population increased from about 49[10] in 1960 to 60.2 in 1994 but has declined slightly almost every year since.[11] Between 2010[12] and 2015,[13] the dentist-to-population ratio (DPR) is projected to begin a sharper decline until reaching 54 dentists per 100,000 by 2025.[14]

Determining whether the declining DPR constitutes a true national concern is complicated for several reasons. First, the DPR is a broad nonspecific indicator useful for comparisons between countries, states, and counties, and for monitoring overall trends; however, it has little predictive value on actual demand or need for dental services. For example, within the US, 16% of the states have more than 70 dentists per 100,000 people, while 36% of the states have less than 50 per 100,000.[15] Despite the

robust number of dentists in some states as indicated by the high DPR, every state in the US has DHPSA.[16] Furthermore, large metropolitan areas average 62 dentists per 100,000 population, nevertheless 26% of DHPSA are in metropolitan areas, while the remaining 74% of the DHPSA are rural areas.[17] Clearly, the distribution of dentists within the US as indicated by the DPR is an important part of the discussion, but the DPR alone does not explain access to care issues.

Second, in the dental marketplace oral healthcare needs do not necessarily translate to demand for services. Studies show that the majority of Americans currently have sufficient access to dental care as evidenced by increasing numbers of children without dental decay, decreasing numbers of decayed or filled teeth in adults, and a dramatic drop in edentulous adults.[18] Even so, the number of Americans who do not have access to dental care is on the rise as indicated by the increasing number of DHPSA from 792 in 1993[19] to 3,400 in 2007.[20] Currently more than 15% of Americans do not have access to dental care.[21] In an effort to address these concerns the Surgeon General emphasized that general health is not possible without oral health. He stated further that there are "profound and consequential oral health disparities within the US population."[22]

Finally, the number of dentists required to serve the Nation's dental health care needs is unknown. Several factors which include access to providers and the ability to pay for services affect the over all assessment of the number of dentists the nation requires. Although access to care is a complicated issue without inexpensive solutions, the access model described by Albert H. Guay is useful in our discussion.[23] Guay's access to care model illustrates the complexity of the issue and facilitates our

understanding by describing three intricate interrelationships.[24] The determinants of access are the effective demand for dental services, the economic environment that supports patients and providers, and the capacity of the dental workforce to respond to demands.[25]

The Demand for Dental Services

Satisfying the demand for dental care is dependent upon the output or the productive capacity of the dental workforce. Output is related to the number of dentists and their individual productivity. With technological advancements, better materials and equipment, and well-trained dental auxiliaries, dental productivity has more than tripled over the past forty years.[26] Continuous year-over-year modest improvements in productivity by the dental workforce could compensate and offset the need for almost 10,000 dentists by 2020.[27] Ergo, these continued improvements in productivity would compensate for some decline in the dentist-to-population ratio. There are two problems with this argument. First, eventually physical limitations must override further increases in output. Second, any increase in the demand for dental care, to include demand for a wider variety of services or other workload would offset any gains realized from improved output.

The marketing of dentistry has unleashed greater awareness of and demand for a larger menu of dental services. As the oral health of the general population improves the practice of dentistry adapts and shifts from needs-based dentistry to desired-based dentistry.[28] Needs-based dentistry is treatment aimed at eliminating disease and restoring dental health and encompasses emergent care and the more traditional

disease elimination and restoration oriented dental services. The military dental health care system is an example of a needs-based dental service.

Desired-based dentistry focuses on a number of elective cosmetic services that enhance the patient's smile and may increase self-esteem. Although many esthetic dental procedures are included in needs-based dentistry, desired-based dental services are elective services that do not improve dental health or function.

Cosmetic dentistry is a lucrative growth industry that continues to draw away a portion of the available dental work force from traditional services that maintain oral health. The demand for cosmetic dentistry helps explain why dental practices remain financially viable in the apparently saturated dental markets in many large cities and metropolitan areas.

Geriatric dentistry, which is dental care for the elderly, is a growth area for dental services. The percentage of older adults in the population is more relevant than ever to the demand for these services. According to the US Census Bureau, this population (persons 65 years old and over) increased by a factor of eleven, from 3 million in 1900 to 33 million in 1994 and is expected to exceed 80 million by the middle of the twenty-first century.[29]

Compared to past generations, the edentulous rate in this demographic is lower and continues to drop as more adults enter senior status.[30] In the past, the majority of older adults were edentulous so this group seldom sought dental care and did not represent a significant demand on the dental care system. Older Americans, who grew up before fluoride and the age of robust preventive dentistry, demand a vast array of dental services to maintain oral health, to improve appearance, and to maintain or

replace failing dental restorations.[31] Strong doubt exits as to whether “any increase in individual dentist productivity alone” can “increase enough to keep up with this demand.”[32]

In 2011, the first baby boomers will reach the age of 65. This generation which was born between 1946 and 1964, represents about 20% of the population.[33] The group, as a whole, grew up during the transition to preventative dentistry and fluoride toothpaste. They will retain more teeth per person than any previous older adult segment in history. Increased life expectancy[34] coupled with this better educated and more financially secure demographic will drive the need, the desire, and the demand for dental care throughout their lives.[35] In the next 30 to 40 years, the demand for dental care to include preventative, restorative, prosthodontic, and periodontal services will continue to increase.

The Economic Environment

Private dental offices are simply small businesses that provide services with the objective of making a profit. The average overhead of a dental office is about 60% of gross revenues.[36] Like any other business, dental offices that cannot make a reasonable profit will close. Sparsely populated areas or DHPSA appear under-served because the low demand, despite the need for services in these areas, can support only a minimum number of dental offices.

The Dental Workforce

Dentistry is a difficult but rewarding profession requiring dedication, self-discipline and a significant investment of time and resources. When the net income of dentists

declines in comparison to other professionals the dental school applicant pool also declines.[37]

Most dentists work full time. There is a trend toward increased part-time work[38] and by 2025, 18% or more of the dental workforce may practice fewer than 32 hours per week.[39] This part-time workforce consists of both men and women but the greatest increase in part-time dentists will come from the growing trend of women entering the dental profession. Women comprised 44.9% of the 2006 dental graduates[40] and tend to work part-time more often during their childbearing and child-rearing years.[41] If dentistry follows the pattern seen in pediatrics then the gender distribution will continue to shift with women dentists possibly out numbering male dentists in the future.[42] The percentage of the dental workforce then practicing part-time should continue to rise, requiring more dentists in the workforce to compensate for the increase in part-time dentists. Since part-time dentists inflate the DPR, the term full-time-equivalent (FTE) has greater value when estimating the size of the dental workforce.

The dental workforce is aging. Eighty-five percent of dentists retire between the ages of 55 and 65 with the average age of retirement being 62.[43] By 2010, 40.41% of the dental workforce in the US will be 55 years or older and by 2015 this percentage peaks at 43.4% and will remain fairly level through 2025.[44] Within the next 17 years up to 40% of the dental workforce could retire.[45]

The retirement of America's aging dental practitioners could provide almost unlimited opportunities for new dentists. Established dentists seeking to expand their dental practice or older dentists preparing for retirement often compete with one another when hiring associates or new dentists just out of dental school. Since 2000, an

average of 49.6% of dental school graduates began their dental careers as an employee or associate in a private dental practice.[46]

Since dentists that own or become partners in a dental practice have the potential for greater income[47] the prospect for new dentists to settle into an established dental practice in the community of their choosing while earning a respectable salary is attractive. When combined with the opportunity to learn the business end of dentistry from an experienced practitioner the attraction is even greater and possibly the main reason why many communities, states, and federal entities have difficulty finding dentists to hire.

Although mass retirements are not expected there is the likelihood of periodic dips in the active dental workforce in the years ahead. Since 2001 the number of new dental graduates has remained in the neighborhood of 4,350 per year.[48] The present number of graduates is too low to keep pace with a growing US population and the number of dentists retiring. To avert a greater shortage of dentists in the future, dental school capacity must increase or the US, like the United Kingdom, may find it necessary to import foreign-trained dentists to meet the demand for dental care.[49]

Shortage of Dentists: US Army

Presently all three military departments face challenges in filling vacant positions and ensuring the dental health of the force.[50] They compete among themselves and with communities, states, federal, and private entities for the few dentists available to recruit and hire. In the environment of a declining dental workforce the military will have even greater difficulty competing for dentists and filling vacant positions. Short of expensive recruiting and retention bonuses or draconian measures such as a medical

draft[51] the impact of a national dentist shortage could threaten the dental readiness of the military.

The US Army Dental Corps has lost the initiative in providing sufficient dental health care services for the Army. The high operation tempo since September 11, 2001 has caused such an increase in demand for dental health care as to overwhelm the system. Instead of increasing dental capacity to meet the demand, the strength of the Dental Corps has declined. Recruiting shortfalls, retirements, and dental officers leaving the service after completing their initial obligations continue to erode the strength and flexibility of the Corps. Out of necessity, the dental health care system has focused available resources on dental readiness at the expense of efforts to eliminate oral disease and promote oral health.

The difficulty the Army Dental Corps has had attracting and retaining sufficient numbers of dental officers has existed for more than twenty years.[52] Ten years ago, the Health Profession Scholarship Program (HPSP), a full tuition scholarship with monthly stipend for medical and dental students, accounted for 95% of Army dental officer accessions.[53] Today this is not the case. From fiscal year (FY) 2005 to the present the HPSP has not met recruiting goals. Accessions each year have declined considerably resulting in a record low of 61% of target in FY 2007.[54] In January 2008 the government improved the HPSP in an effort to reverse the downward trend.[55]

The US Army Dental Corps is presently 17% or 185 positions below the budgeted end strength (BES) of 1104 dentists.[56] Particularly disturbing is the 24% or 178 dentist shortfall from the BES of 738 general dentists[57] General dentists represent the true

strength of the Dental Corps [58] as they treat the majority of dental disease referring only special problems and complex treatments to dental specialists.

The Dental Corps must focus on the daunting task of retaining all serving dental officers since most leave after their first tour of duty and 21% of the senior dental officers are retirement eligible.[59] To compensate for the shortage of dental officers DENCOM has increasingly relied on contracting dentists, hiring Department of the Army Civilian (DAC) dentists, and outsourcing dental health care services to local civilian dentists. So far, these measures have proven sufficient to prevent failure of the primary mission; however, until the war on terror ends and the Army decreases in size or DENCOM increases in capacity these actions are not robust enough to reverse the trend of increasing unmet dental treatment needs (see Tables 2 and 3 and the discussion on unmet treatment needs).

Oral Disease: Impact on the Nation and Military

Dental caries and periodontitis are chronic, destructive processes that generally become more severe over time. The single most common chronic childhood disease is dental caries.[60] Periodontal disease, which primarily affects adults, is a major cause of tooth loss in adults over age 35.[61] The consequences of untreated oral diseases are pain and suffering, impaired masticatory function, and low self-esteem. These maladies also contribute to poor quality of life and reduced productivity for those severely afflicted. Untreated oral disease may deteriorate to dental emergencies, which are acute problems, and in some cases life threatening, which dramatically disrupt normal life activities. In 2008 oral health problems will cost the US economy an estimated 282 million hours of lost productivity (an average of 1.48 hours per employed adult).[62]

Prevention and Treatment of Oral Diseases

Periodic dental examinations and interceptive preventative-based dental care effectively and efficiently prevent most oral diseases. Nevertheless, oral diseases afflict most people to some degree during their lifetime.

Oral disease is insidious because it progresses slowly without symptoms until there is considerable destruction. Untreated disease eventually manifests first to the sufferer as pain, swelling, or loss of function unless first detected by examination. Delaying dental treatment is common for many reasons: fear of dentists and pain avoidance, lack of access to care, economic considerations, or a high military operation tempo. Delay of treatment only serves to increase the severity of the disease, the cost of treatment, and the risk of a dental emergency.

Periodic examination and maintenance are critical to oral health because the oral cavity is a harsh ever-changing environment. Unlike the majority of medical diseases that heal without lifelong consequences the tissue destruction caused by dental caries or periodontitis never heals to its natural, unmolested state. Even with the elimination of disease and the restoration of oral health, the teeth and gums remain at greater risk for recurrent disease and additional treatment over a lifetime. Prevention is the best and most economical treatment plan.

<u>The New Dentists: Can They Be Recruited and Retained?</u>

Most dentists do not decide on dentistry as a career until after they have entered college.[63] Only one third of the 2006 dental graduates knew they wanted to pursue dentistry as a career before college, 50% chose dentistry while in college, and 16% made the decision after graduating from college.[64] Established dentists, whether

relatives, friends, or a family dentist are strong influences in an individual's decision to become a dentist,[65]

Recruiting visits by military dentists to colleges and universities may present rich recruiting opportunities to inform potential dental students about military dentistry, careers, and scholarship programs. Recruiting dentists from this group will be an arduous task since military dentistry is compatible only with one (service to others) of the top three reasons young adults select dentistry as a career; specifically, control of their work time (88%), service to others (84%), and opportunities for self-employment (82%).[66]

The 5.9% of graduating dentists from the class of 2006 that entered government service was the lowest percentage in the 21 years of the Annual American Dental Education Association (ADEA) Survey of Dental School Seniors.[67] Current military activity and deployments may have had a negative influence on accessions. Other likely factors include income, expected lifestyle or living standards, and frequency of relocation.[68] Private dental practice not only pays better than government service but also provides the stability and affluence many deem important.

Army dental officers cite pay as their primary reason for leaving the service.[69] In 2004 the average net income for a dentist in private practice, owned or partially owned, was about $186,000.[70] Employed dentists or employee dentists earn less. A web search listing positions for new dentists revealed a range of opportunities paying between $85,000 and $154,392 a year plus bonuses.[71] The US Department of Labor lists the annual mean wage for employed dentists as $140,950 and the annual median wage as $132,140.[72] By comparison military dental officers with zero to three years

experience earn between $67,422 and $82,566 per year, respectively.[73] After three years of service young dental officers understandably begin looking for better opportunities.

The military pay system may not meet the needs or expectations of younger dentists. Perhaps one explanation for poor retention is the failure of DoD to recognize the value of the HPSP as part of the compensation package over the obligation period. In return for supporting the dental student through school debt free, the dentist serves four years on active duty. If the value of the scholarship, stipend, and fees are worth $200,000 for the four years of dental school, then the value of the HPSP obligation is worth $50,000 per year over the repayment period. After completion of the 4-year obligation the now experienced and inherently more valuable dental officer does not receive any significant increase in pay. Without a considerable increase, to remain on active duty at the same pay is in reality a large pay cut. Since the experienced dental officer has many better paying alternatives to military service we can only expect them to leave the service when they complete their obligation, unless they elect to stay for dental specialty training.

New dentists may have higher monetary and lifestyle expectations than military compensation affords. If the Generation Y model holds true then their expectations of income and standard of living will be high.[74] Most Generation Y workers also expect flexible hours, time off, and comparatively more rapid promotions than do older workers.[75] Their parent's affluence accumulated over years may serve as the model for their expectations. The parents of this group are better educated, earn higher incomes

than the general US population, and over 44% of have combined annual incomes of over $100,000.[76]

Education Debt

Dentists invest 8 years of post high school study to become an entry-level dentist. The dental specialties require 2 to 6 years of post-doctoral study.[77] In 2007, dental school tuition ranged between $11,125[78] and $68,835[79] per year. Additional expenses include required fees, books, instruments, subsistence, and housing. Education debt continues to trend higher and graduating dentists concerned with retiring their debt burden will gravitate towards employment that best enables them to meet their obligations. The average education debt ($162,155) reported by the 2006 graduating class is a 15% increase over the amount reported by the 2005 graduates.[80] Students attending public dental schools have less debt ($137,792) than those attending private dental schools ($196,636).[81] Graduates report that the amount of their debt influenced career plans.[82] They are more likely to go directly into private practice in affluent urban settings or choose dental specialty training rather than practice in rural, underserved metropolitan areas, or government service.[83]

The rising costs of dental education may have implications for oral health affecting the nation and the military. High tuition and related expenditures may deter prospective students with limited financial resources and those unaware of the HPSP and its attendant benefits and cause them to opt for other careers. The rising costs of dental education "are likely to influence who attends dental school as well as the segments of the population that dentists are likely to treat upon graduation."[84]

While still too early to evaluate for effectiveness, the FY 2008 Federal Budget authorized two impressive recruiting incentives aimed at improving dental officer accessions for the military.[85] Dentists that join the military (direct accession) now receive a critical skills accession bonus (CSAB) of $75,000.[86] Dental students awarded the HPSP after January 4, 2008 receive a $20,000 CSAB, a $1,900 monthly stipend and full tuition including books and fees.[87] To maximize the advantage of the new HPSP the DoD needs a well-crafted and robust advertising campaign to inform college students, senior dental students, and recent dental graduates about these generous recruiting incentives. While these new incentives may help with future accessions, they do nothing to halt the current exodus of experienced dental officers. The DoD needs a comprehensive program with sufficient incentives to retain these experienced and valuable assets.

Dental Readiness

Oral diseases are ubiquitous in our society and in our troops—most notably in recruits[88] and troops when they redeploy from combat operations.[89] Predisposed by the presence and chronic nature of dental diseases the oral health of deployed troops deteriorates unless countered by proper oral hygiene and prudent nutrition. Tobacco use (especially smokeless tobacco),[90] frequent consumption of sugar laden soft drinks and snacks, improper oral hygiene, and stress create a synergy that accelerates the destructive nature of oral disease. Consequently 10% to 20% of our troops experience dental emergencies.[91]

Excellent oral health is a force multiplier for several reasons. Fewer dental emergencies mean that more soldiers are present for duty and focused on the mission[92]

and are at less risk as fewer convoys and escorts are required to transport soldiers to the dentist. Dental assets in theater and at home are free to use their time more efficiently preventing dental emergencies rather than treating them. Given the current operation tempo, with repeated cycles of deployment and redeployment, oral health is difficult to achieve and even more difficult to maintain.

The terms oral health and dental readiness are not synonymous. Oral health is the absence of oral disease and dental readiness is simply the status of a soldier that is dentally fit for worldwide deployment. Most dental-ready soldiers in the US Army today have residual dental disease while only 20% have oral health.[93]

The Department of Defense Oral Health and Readiness Classification System (OHRCS) standardizes dental readiness criteria across the military departments to facilitate dental readiness communications and reporting.[94] The OHRCS helps "commanders estimate how many of their soldiers are likely to require treatment for dental emergencies during a deployment. Commanders can minimize personnel losses to treatment or MEDEVAC by ensuring that as many soldiers as possible are Dental Class 1 prior to deployment."[95] Dental units use the OHRCS to prioritize treatment. Developed by necessity during the Viet Nam War,[96] useful but not sensitive enough,[97] the four dental readiness classifications (DRC) provide the military with a simple tool that communicates a soldier's "Go" or "No-Go" status for dental readiness (see Table 1).

Although DRC 2 identifies soldiers as dental ready they are not disease free. Given time and a conducive environment, untreated dental disease usually results in a dental emergency, which is defined as "a condition of oral disease, trauma, or loss of function, or other concern that causes a patient to seek immediate dental treatment." [98]

Elimination of dental disease significantly reduces the incidence of dental emergencies.[99] No amount of dental care can prevent all dental emergencies because some are the result of trauma and not disease.

Department of Defense Oral Health and Readiness Classification

Dental Readiness	**DRC**		Dental Exam	Deployable
YES	1	Oral Health. Does not require dental treatment or reevaluation	Current	YES
YES	2	Requires non-urgent dental treatment or re-evaluation for conditions, which are unlikely to result in dental emergencies within 12 months.	Current	YES
NO	3	Requires urgent or emergent dental treatment.	Current	NO
NO	4	Unknown DRC status.	Required	NO

Table 1: Department of Defense Oral Health and Readiness Classification
Adapted from DoD Health Affairs Policy 02-11

Since dental emergencies are more frequent in troops with poor oral health before deployment[100] the overarching goal should be to establish oral health as the standard for the force and to eliminate all oral disease. Presently there are not enough resources available to the US Army dental care system to attain the minimum standard of 65% oral health in the force;[101] consequently, limited resources must focus on eliminating the urgent and emergent conditions and non-emergent but higher risk conditions. To facilitate the identification of the soldiers at greatest risk, senior dental leaders need to renew the call for a more sensitive dental readiness classification system that helps identify and prioritize the urgent and emergent conditions and those non-emergent but higher risk conditions in soldiers with poor oral health.[102] The broadness of the DRC 2

category is not sensitive to the quantity or quality aspects of oral disease. DRC 2 may include treatment plans for routine dental prophylaxis as well as treatment plans with five or more caries or emerging periodontal conditions. The latter two are non-emergent but higher risk conditions especially during deployment.

In 1999, the estimated cost to achieve oral health (DRC 1) for the US Military active duty population was $1.9 billion.[103] In 2008, the Army's share of those costs and workload are much greater because of the operation tempo and the poor dental health of recruits. During the 18-month period from July 2006 to December 2007 the total unmet treatment needs in the US Army increased 16%[104] (see Table 2 and 3). In the same timeframe, the unmet DRC 3 treatment needs increased 29%.[105]

The dental care system cannot keep up with the increasing workload. The shortfall of dentists available to DENCOM is the most important, but not the only issue. Attendant difficulties have to do with delivering needed care to soldiers. Leaders and soldiers fail to understand the importance of maintaining oral health and how it relates to the success of the Army mission. There is often reluctance to release soldiers from duties and field exercises creating the problem of patient unavailability or failed appointments. A soldier's fear of dental care (dentophobia), without the encouragement and support of leadership to seek timely treatment, results in greater risk to the soldier and the unit, and contributes to the growing backlog of unmet dental needs.

As of December 2007, the dental care backlog of the Army was almost 1.4 million procedures[106] (see Table 4). Operative dentistry (44%), oral surgery (17%), and dental hygiene (17%) represented 78% of all DRC 2 and 3 unmet treatment needs.[107] The DRC 3 treatment needs alone were 3% of the total backlog and represented

approximately 78,000 hours of dental care.[108] The top three treatment groups, operative dentistry (54%), oral surgery (23%), and endodontics (11%), dominated 88% of the DRC 3 treatment needs (see Table 5).[109]

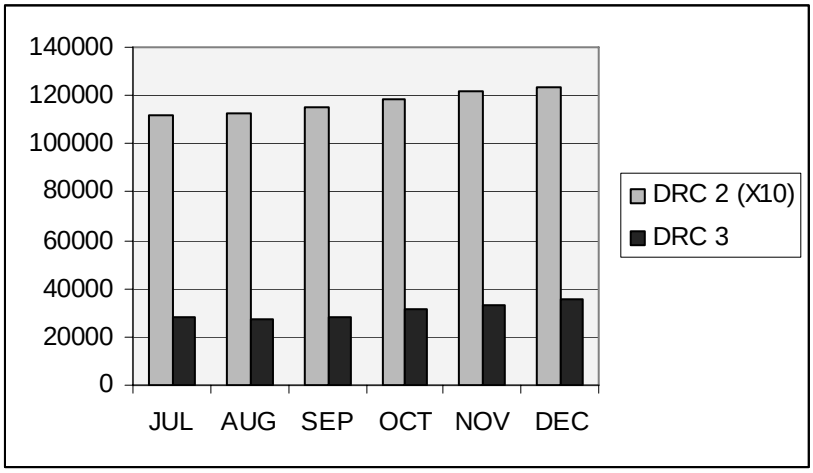

Table 2: Total Treatment Needs JUL-DEC 2006.
Data from MEDPROS (As of 21 DEC 2007)
(Multiply DRC 2 data by 10. Example: 1.33 Million not 133 Thousand)

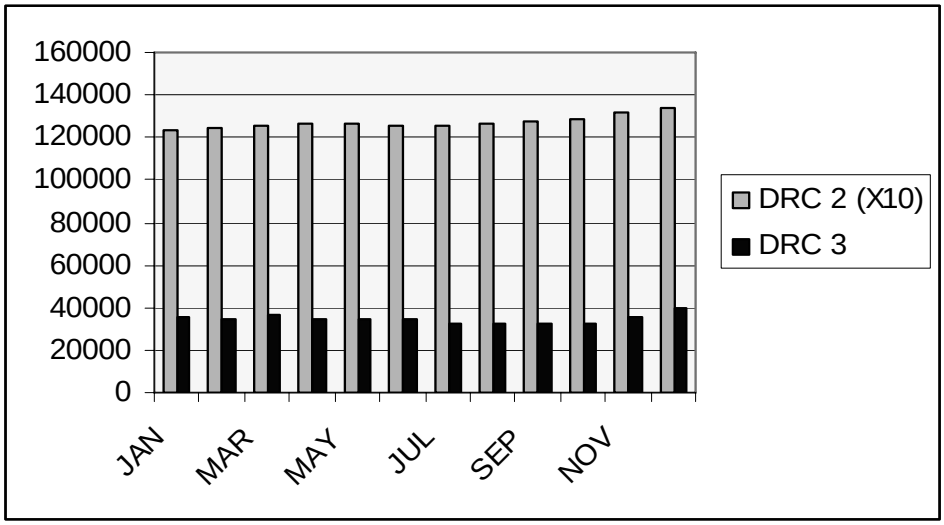

Table 3: Total Treatment Needs JAN-DEC 2007
Data from MEDPROS (As of 21 DEC 2007)
(Multiply DRC 2 data by 10. Example: 1.33 Million not 133 Thousand)

2006			2007		
MONTH	DRC 2	DRC 3	MONTH	DRC 2	DRC 3
JUL	1121620	28115	JAN	1237420	35690
AUG	1127540	27741	FEB	1246740	34619
SEP	1152260	28102	MAR	1254180	36577
OCT	1184910	31100	APR	1263420	34356
NOV	1214720	33342	MAY	1264570	34125
DEC	1236260	35931	JUN	1257790	34096
			JUL	1258060	32851
			AUG	1266710	32433
			SEP	1275290	32072
			OCT	1290410	32795
			NOV	1313560	35813
			DEC	1333830	39327

Table 4: Total Treatment Needs by Dental Readiness Classification (DRC)
Data from MEDPROS (As of 21 DEC 2007)
Table 4 represents a continuum from July 2006 through 21 December 2007

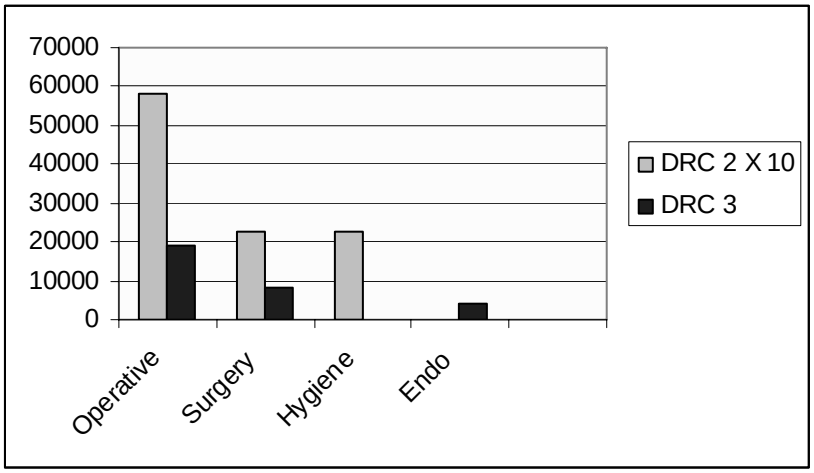

Table 5. Treatment Needs: Top 3 Groups by DRC (Average) JUL 06 to DEC 07
Data from MEDPROS (As of 21 DEC 2007)
(Multiply DRC 2 data by 10. Example: 580 Thousand not 58 Thousand)

Treatment Groups 4 of 11 Groups	DRC 2	DRC 3
Operative	5796360	19240
Surgery	226060	8286
Hygiene	2247240	1
Endo	80	4065

Table 6: Treatment Needs: Top 3 Groups by DRC (Average) JUL 06 to DEC 07
Data from MEDPROS (As of 21 DEC 2007)

The backlog of unmet treatment needs has three sources: redeploying soldiers, garrison soldiers, and recruits. Redeploying troops bring back a large volume of dental care needs because of the residual disease present at the time of deployment. The operation tempo, the failure to maintain adequate oral hygiene, poor snacking habits, and the limited dental support available in theater combine to exacerbate pre-existing problems. The impact of the spike in volume of dental workload from redeploying units often overwhelms the capacity of dental activities especially when other units are preparing to deploy. Priority of care goes to ensuring dental readiness for deploying units.

Most garrison troops have unmet dental care needs even though as a group they have the greatest access to care. Garrison troops are those back from deployment 90 days or more without orders for their next deployment.[110] The mandatory annual dental examination identifies additional workload from soldiers that become DRC 2 and 3 from one year to the next.

Almost all recruits enter the military with dental health care needs and nearly half (42%)[111] have DRC 3 dental conditions. In 2003 the Army Dental Corps initiated First-Term Dental Readiness (FTDR), a program designed to address the high DRC 3 rates in trainees and recruits at several larger Advanced Individual Training (AIT) and One

Site Unit Training (OSUT) sites.[112] The goal is to "provide dental care to soldiers earlier in their careers so that they are dentally deployable when they arrive at their first permanent duty station."[113]

Elimination of all DRC 3 dental conditions accomplishes the dental readiness mission; however, this accomplishment may not contribute significantly to an increase in the oral health (DRC 1) of the Army. The majority of DRC 3 troops have multiple dental treatment needs. Once the DRC 3 conditions are treated the troops convert to DRC 2 (dental readiness) which means that they lose priority of care status and command oversight.

Army culture recognizes and demands dental readiness, but fails to recognize oral health as the best force multiplier. For whatever reason, ignorance, operation tempo, fear of dentists, or difficulty with access to care, up to half of the force never obtains DRC 1 status during their first term.[114] Except for those with DRC 3 and 4 dental conditions soldiers have a choice when deciding about their dental care. Those who want dental treatment usually obtain it and those who choose to avoid dental care may do so until their next mandatory annual dental examination. Leaders who understand the benefits of oral health can make a difference. For example, in September 2006, the 1st Engineers Battalion, 1st Brigade, 1st Infantry Division deployed to Iraq with 43% DRC 1.[115] Battalion leaders had decided to change the oral health culture in their battalion and worked diligently with the supporting Dental Activity to ensure their soldiers deployed in the best possible oral health.

Upon redeployment over a year later 12% of the unit had converted to DRC 3,[116] which is in line with expectations. DENCOM anticipates and plans for a 12% DRC 3

rate for redeploying units.[117] However, during the 14-month deployment the 1st Engineer Battalion experienced just 25 dental emergencies for an overall 3.8% per year emergency rate (38 dental emergencies /1000 troops / year).[118] To put this into perspective their emergency rate was 6.2 percentage points lower than projected.[119] The impact of available dental care in Iraq is unknown. If interception dental treatment were available then it may have played a role in reducing this dental emergency rate.[120] Whereas sound conclusions are difficult to draw without complete data, there is sufficient to illustrate the point that leadership makes a positive difference. Battalion leadership ensured the unit deployed in the best oral health possible and during the deployment very few troops missed duty due to dental emergencies.

Even with intensive efforts to eliminate dental disease dental emergencies still occur, albeit at a much-reduced rate. The quintessential example is from the US Navy where heavily screened submariners deploy in DRC 1 (oral health), yet as a group, they still experience a 3% per year dental emergency rate.[121] The background rate or the lowest dental emergency rate expected for units at 100% dental readiness is about 10% per year. [122]

Other studies accept a background dental emergency rate between 15% and 20% per year[123] and would project 510 to 680 dental emergencies for a typical Army brigade during a one-year deployment. The more optimistic background rate of 10% per year (340 for an Army brigade) or fewer is attainable with adequate pre-deployment preparation.

Recruits and Oral Health

Many recruits come from a lower socioeconomic demographic and enter the military with dental health problems. As civilians they did not pursue regular dental examinations or treatment; consequently, established attitudes continue to influence a pattern of poor oral health and high caries risk.[124]

Recent recruiting demographics and recruit dental examination data support the premise of a strong link between recruit socioeconomic status and a rise in the dental workload. For the past three years the Army has not met its recruiting goal of at least 90% high school graduates. The percentage of recruits coming from middle and high-income segments of the population and those scoring in the top 50% of Army qualification tests has continued to decline.[125] Recent unpublished recruit dental readiness data (46.4% DRC 3)[126] indicates a four-percentage point increase over the 42% DRC 3 rate reported for recruits in 2000.[127]

Given the military's diversity, the incidence among the military population is not representative of the US population.[128] Military recruits include a higher ratio of men to women, a higher proportion of minorities and a higher proportion of those of lower socioeconomic status than the civilian population. This description of the recruit demographic is very similar to the civilian demographic that typically avoids dental care (young males, ethnic minorities, low income and education, and those with dental anxiety).[129]

One study suggests an inverse relationship between high caries risk in the military and age, rank, education, and time in service.[130] Therefore, serving in the military over time has a positive influence on the reduction of caries risk. Mandatory annual dental

examinations, DRC 3 dental care, and repeated oral hygiene instruction provided to the soldier over many years has a positive effect.

Basic Combat Training (BCT) and Advance Individual Training (AIT) do not teach recruits preventative oral health. Unless recruits acquired these skills before entering the military new soldiers will report to their first duty station without the necessary skills to sustain or improve oral health. The Army needs to change this paradigm by instilling a culture and expectation of oral health at the onset of a soldier's career. A demographic like military recruits that has never experienced oral health will not, without education and instruction, suddenly adopt good oral hygiene and nutrition practices.

Recommendations

The following recommendations are in addition to those discussed within the body of the paper. The goal of all recommendations is to improve greater efficiency with limited resources while maximizing the oral health of the force.

Support Mandatory Universal Dental Residency Program (PGY-1)

The DoD should work with the US Department of Health and Human Services to support a National strategy to implement mandatory universal dental residency (PGY-1) training for all US dental school graduates. In 1995, the Institute of Medicine (IOM) advocated the creation of post-graduate education programs sufficient to accommodate all dental school graduates by 2005.[131] The IOM report states, "…it is not clear that undergraduate dental education adequately prepares the average graduate for entry level practice."[132] Most Veteran Administration and military General Practice Residency program directors agree, reporting a "high level of inadequate preparation among incoming dental residents… in physical evaluation, oral diagnosis, and treatment

planning…"[133] Military program directors added that residents were also inadequately prepared in oral surgery, operative dentistry, and endodontics.[134] Since military dentists deploy individually they must be proficient in all these competencies. All new military general dentists should have an Advanced Education in General Dentistry 1-year (AEGD 1-Yr) designed for military dentists or the PGY-1.

Currently, Delaware and New York require dental residencies for licensure in their respective states. The PGY-1 program is good for the Nation and the DoD on several fronts.

Universal PGY-1 programs will help promote better dental health among the underserved in the intercity and rural areas of America while providing the resident in-depth practical experience in dental medicine. The benefit to the DoD is that future recruits from underserved or poor economic areas will potentially enter military service with better dental health. Direct accession military dentists will have better training and greater capability to serve in positions requiring minimal supervision.

The DoD can support the universal residency program by sponsoring civilian PGY-1 programs on large military posts and bases. DOD sponsorship of PGY-1 programs has two major benefits to the DoD. 1. The provision of dental support at less cost to the government and an opportunity to recruit military dentists from the pool of residents. Stipends for dental residents are less than the costs for military dental officers or contract dentists. 2. Working with the Department of Health and Human Resources, DoD could create funding streams to help pay for the PGY-1 programs and the stipends without actually employing the residents. Current law and regulations will require modification, specifically the DoD requirement for dental residents to have a dental

license. Some states, for instance New York, require recent dental graduates to complete a PGY-1 program in lieu of clinical examination for state dental licensure.

With the adoption of mandatory universal PGY-1, the HPSP and the military dental programs such as the AEGD 1-yr and dental specialty training programs, may have greater appeal to dental students. Conceivably the military could be in a position to select the best dentists for military service. Filling the ranks with dental officers will reduce the added costs associated with contracting dentists and outsourcing dentistry to the civilian market.

Modify the Oral Health and Readiness Classification System

The Oral Health and Readiness Classification System (OHRCS) is not sensitive enough for high operation tempo dental support to an expeditionary military. The proposed five-classification system is similar to a previous proposal[135] but with minor modifications designed to make the system a more sensitive and useful tool (see Table 7).

DRC 3 and 4 essentially remain the same; however, the former DRC 2 classification group is divided into a low risk classification (DRC 1) and a moderate risk classification (DRC 2) based on caries risk.[136] The inclusion of periodontal screening and recording (PSR) criteria helps identify the high-risk soldier who requires a periodontal referral and therapy as DRC 3.[137] The former DRC 1 becomes DRC 0 to distinguish soldiers that require a cleaning or follow up appointment (DRC 1) from those that require no further treatment (DRC 0).

Proposed Oral Health and Readiness Classification

Dental Readiness			Dental Exam	Deployable
YES	DRC **0**	Oral Health. Does not require dental treatment or reevaluation	Current	YES Low Risk
YES	DRC **1**	Requires non-urgent dental treatment or re-evaluation for conditions, which are unlikely to result in dental emergencies within 12 months. Caries Risk: Low or Moderate PSR: All 2 or less	Current	YES Low Risk
YES	DRC **2**	Requires non-urgent dental treatment or re-evaluation for conditions, which are unlikely to result in dental emergencies within 12 months. Caries Risk: High PSR: 2 or less with one 3 allowed in 6 sextants	Current	YES **Moderate Risk**
NO	DRC **3**	Requires urgent or emergent dental treatment. Caries Risk: High PSR+ (two or more 3s) any 4	Current	NO **High Risk**
NO	DRC **4**	Unknown DRC status.	Required	NO **High Risk**

Table 7: Proposed Oral Health and Readiness Classification

Adapted from: DoD Health Affairs Policy 02-11
M. Fontana and D. Zero, Assessing patients' caries risk
L.L. Covington et al, The Application of Periodontal Screen and Recording on a Military Population

A new OHRCS, such as the one proposed here is necessary for dentists to quickly identify the high and moderate risk service personnel without spending countless hours screening individual dental records. When managed by preventive dentistry teams (see below for discussion on preventive dentistry teams) this system will expedite

communication and coordination among the dental staff resulting in a more efficient use of limited resources.

Preventive Dentistry Teams (PDT)

DENCOM needs to focus additional effort on preventing and intercepting oral disease. Preventive Dentistry Teams (PDT) or dental care coordinators would manage all DRC 3 soldiers and those with high caries risk assessments (CRA) and high periodontal screening records (PSR). The PDT would serve as patient care managers ensuring that high and moderate risk patients complete their prescribed treatment plans in an expeditious manner to break the dental infection cycle. PDT coordinates all patient appointments, referrals, and recall evaluations.

The PDT recalls would focus on disease prevention, education, instruction, and preventative protocols designed for those soldiers with high risk of oral disease. Properly resourced and utilized PDT promise greater efficiency of dental care in terms of cost effectiveness by intercepting and eliminating disease early and changing behavior for life long oral health.

Failed Dental Appointments

Improvements in working conditions, attitude, skills, knowledge, technology, and the availability of highly trained dental auxiliaries all may increase the individual provider's productivity. However, the elimination of failed (no-show) dental appointments is the greatest and most cost effective improvement to dental productivity. Soldiers failed 14,503 or 7% of the 206,000 scheduled dental appointments in October 2007.[138] Hypothetically, in the event that all of these failed appointments remained unfilled, the cost to the government could have exceeded $2.9 million in lost

productivity.[139] Although dental staffs make every attempt to fill this time many hours of valuable productivity are lost. Every unfilled hour represents not only lost dental readiness to the unit but wasted resources and additional expense to the government for the non-productive overhead.

By regulation, commanders are responsible to ensure that soldiers report as appointed to the dental clinic.[140] DENCOM does not have an effective mechanism to hold soldiers accountable for missed appointments. Perhaps one approach is to debit a modest fee from the soldier's unit Morale, Welfare, and Recreational (MWR) account. For each failed dental appointment, a small charge would go against the unit account and credited back to the post MWR fund.

Such a deterrent would bring to the forefront the importance of timely, consistent dental treatment and the command's determination to achieve oral health. Soon pressure from peers and unit leadership would significantly reduce the problem and potentially save the military millions of dollars in lost productivity each year. The Dental Activity would realize greater efficiency, increased productivity, and dental readiness would improve as well.

Oral Health and Nutrition Training to Promote an Oral Health Culture

The Army needs to promote oral health as its standard instead of dental readiness. Most leaders believe dental readiness is the goal and do not recognize it as the minimum acceptable standard. To alter this cultural misunderstanding the Army needs a concerted oral health campaign that emphasizes the prevention of oral disease and the obtainment and maintenance of oral health early and throughout the soldier's career. The way ahead would include oral health and nutrition instruction during BCT,

AIT, and all initial and intermediate leader development training; sufficient time and dental resources at all OSUT and AIT stations to ensure 100% dental examinations in accordance with DENCOM standards[141] and 100% dental readiness for all trainees before they depart for their next duty station. The vision of first term dental readiness (FTDR) needs to expand to include second term oral health (STOH) as part of this overarching goal.

DENCOM could work with US Army Training and Doctrine Command (TRADOC) and Tri-Service Center for Oral Health Studies (TSCOH) to design and evaluate programs of instruction for oral health and nutrition training. Furthermore, oral health and nutrition programs designed specifically for Army leaders will help inculcate a culture and expectation of oral health in the Army. Over time, the benefits of such a concerted program will improve the dental readiness and oral health of the force.

Conclusion

Currently the United States enjoys excellent dental health care but the threat of a National shortage of dentists is rising. The ratio of dentists to population is declining and will continue to decline as the population growth rate surpasses the growth rate of the dental workforce. Forty-five million citizens are without ready access to dental care and that number continues to rise. The US military relies on dental readiness as a key component of the soldier's overall medical readiness; better oral health of the force translates into a lower dental emergency rate.

The Army Dental Corp has not met its recruiting goals in over twenty years and in recent years dental accessions have dropped to all-time lows. There are insufficient numbers of dentists in the Army to handle the current workload to achieve the desired

overarching goal of oral health. The current number of dental officers is sufficient only to accomplish the dental readiness mission. The United States must increase the number of dental practitioners in the workforce and the military must find better ways to recruit and retain dental officers. Until the disparity between dentist-to-population ratio improves the military must maximize efficiency and mobilize all available resources to promote disease prevention and oral health as early as possible; to identify and intercept oral disease early in higher risk soldiers to break the disease cycle; and to ensure 100% dental readiness of all deploying forces.

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